CEO Gender and Compensation: Evidence from Vietnamese Construction and Construction Material Companies

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Abstract
This paper examines the relationship between CEO gender and compensation. The sample consists of construction and material construction companies listed in the Vietnamese stock market between 2012 and 2019. The result estimated from a pooled Ordinary Least Squares model shows that female CEOs receive less compensation than male counterparts. This result does not change when we employ a fixed effects model to deal with the endogeneity caused by time-invariant omitted variables or when we use a random effects model to capture the effects of heterogeneity between firms. Our results suggest that CEO gender pay gap may exist in countries where the degree of gender inequality is severe. Policymakers should be aware of this situation and have some solutions to reduce the gap.

1. Introduction

When investigating the gender pay gap of many countries around the world, ILO (2018) finds that the gender pay gap has occurred in both developing and developed countries. This report shows that on average the female income is around 16% lower than male income. Additionally, the report shows that the gap is less severe in developed countries than in developing countries. The existence

of the gap is also documented in previous studies, such as Altonji and Blank (1999) and Murphy (2005). These studies find that the income of a female employee on average is approximately 23% lower than that of a male counterpart. However, the gender pay gap seems not to exist for top managers such as chief executive officers (CEOs) (e.g., Gupta et al., 2018).

The aim of this study is to investigate the relationship between CEO gender and compensation in Vietnam. Previous studies that examine this relationship are conducted in several developed countries such as the United States or the United Kingdom or in an emerging country such as China. We select Vietnam as our setting because the gender inequality in Vietnam seems to be more serious than in the other countries. For example, the Gender Inequality Index of Vietnam ranks 72/177 countries in 2018. This rank is nearly double the rank of the United States and China and is nearly triple the rank of the United Kingdom. This suggests that the results found in Vietnam might be different from those in the previous studies.

Our sample consists of 109 Vietnamese listed companies operating in the construction and material construction industry from 2012 to 2019. In our sample, approximately 95.6 percent of CEO are male. We construct a regression model where the dependent variable is the natural logarithm of CEO compensation and the independent variable is a binary variable, taking the value of 1 if the CEO is male and 0 if otherwise. Using a pooled Ordinary Least Squares (OLS) regression model, we find that female CEOs receive lower compensation than male CEOs. This result does not change when we employ alternative regression methods such as a fixed effects model or a random effects model. Overall, our study contributes to the literature on the CEO gender pay gap by providing new results for a new setting.

The remainder of this study is structured as follows. Section 2 discusses relevant prior literature. Section 3 describes the data and methodology employed in this study. Section 4 presents empirical results. Section 6 concludes.

2. Literature Review

Most of the literature that addresses issues related to gender pay gap reveals that female workers tend to be paid less than male workers. ILO (2018) reports that gender pay gap exists in both developed and developing countries. According to this report, men can be paid around 16 per cent higher than women. Altonji and Blank (1999) and Murphy (2005) also show that the income of full-time female workers is approximately 23% lower than that of full-time male workers. Blau and Kahn (2017) also find similar evidence. However, they show that the gap tends to reduce over time.

Joshi et al. (2015) indicate that although the difference between the productivity of male and female workers is minimal, the compensation gap between them is substantially large.

However, the gender pay gap seems not to exist for top managers such as CEOs. Several studies do not find any relationship between CEO gender and compensation. For example, Jordan et al. (2007) investigate the CEO gender pay gap using a sample consisting of 100 companies listed in Fortune 100 between 2001 and 2003. Their results show that there is no difference in mean and median of the compensation between male and female CEOs. Bugeja et al. (2012) also find similar results when studying the gender pay gap between the male and female CEOs of 291 companies listed in the US during the period from 1998 to 2010. Using a sample including companies listed in the UK, Geiler and Renneboog (2015) also indicate that there is no gender discrimination in terms of CEO compensation in this country. Beside, Huy, D.T.N (2015) also mentioned roles of CEO and board in corporate governance.

Some studies even find that female CEOs earn higher compensation than male CEOs. For instance, Adams et al. (2007) examine the CEO gender pay gap of 1500 companies listed in the United States from 1992 to 2004. They find that before becoming CEO, women have lower compensation than men. However, after becoming CEO, the former have higher compensation than the latter. Bertrand and Hallock (2001) also find similar evidence. Their results indicate that female CEOs have higher compensation than male CEOs. By contrast, several studies report that female CEOs are under-compensated compared with male CEOs. For example, Lam et al. (2013) investigate the association between the CEO gender and compensation of companies listed in China. Their results show that the compensation of female CEOs is statistically lower than one of male CEOs.

Overall, previous studies provide mixed evidence about the relationship between CEO gender and compensation. This may be because they use different settings. In this paper, we use a new setting consisting of Vietnamese listed companies. The gender inequality in Vietnam seems to be more severe than in the other countries. The Gender Inequality Index of Vietnam ranks 72/177 countries in 2018, which is nearly double the rank of the United States and China and is nearly triple the rank of the United Kingdom. As a result, we predict that female CEOs might have a lower level of compensation than male CEOs. We develop the following hypothesis:

Hypothesis 1: Female CEOs have lower compensation than male CEOs.

3. Data and Methodology

Our sample includes 109 Vietnamese listed companies operating in the construction and material construction industry during the period from 2012 to 2019. We collect the information about CEO gender and compensation from the companies' annual statements. We source the companies' financial data from FiinPro Database.

To investigate the relationship between CEO gender and compensation, we follow the previous studies (i.e., Bugeja et al., 2012) and employ the following regression model:

$$\text{Ln(Compensation)}_{it} = f(\text{CEO\_Gender}_{it}, \text{Control}_{it}) \hspace{2cm} (1)$$

where i and t index company i and year t, respectively. The dependent variable of model (1) is Ln(Compensation), which is calculated as the natural logarithm of total CEO compensation. The independent variable is CEO_Gender, which is a dummy variable taking the value of 1 if the CEO is male and 0 otherwise. We employ four control variables in model (1). The first control variable is Leverage, measured as the total debt over total assets. The second control variable is Size, computed as the natural logarithm of total assets. The next control variable is EBIT_Assets, calculated as the ratio of earnings before interest and taxes over total assets. The final control variable is Cash_Ratio, which is the ratio of cash and cash over total assets. The definition of these variables is provided in Table 1.

Table 1 - Variable definition
This table presents the definition of variables used in this study.

Variable	Definition
Ln(Compensation)	The natural logarithm of CEO compensation.
CEO_Gender	Binary variable, taking the value of 1 if the CEO of a company is male and 0 otherwise.
Leverage	The ratio of total debt over total assets.
Size	The natural logarithm of total assets.
EBIT_Assets	The ratio of EBIT over total assets.
Cash_Ratio	The ratio of cash over total assets.

Table 2 provides summary statistics of all variables employed in this study. As can be seen from this table, around 96 per cent of CEOs in our sample are male. The average of Ln(Compensation) is approximately 19.097 with the standard deviation of 1.279. The summary statistics of control variables are also reported in this table.

Table 2 - Summary statistics
This table presents the summary statistics of variables used in this study. The definition of the variables is provided in Table 1. All variables are winsorized at the 1st and 99th percentile.

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
CEO_Gender	675	0.956	0.206	0.000	1.000
Ln(Compensation)	675	19.097	1.279	16.525	22.050
Leverage	675	0.588	0.211	0.073	0.923
Size	675	27.132	1.363	24.358	30.631
EBIT_Assets	675	0.062	0.073	-0.143	0.363
Cash_Ratio	675	0.050	0.060	0.001	0.358

Table 3 reports the correlation matrix of all variables employed in this study. The results show that the correlation coefficients of the variables are all lower than 0.7. This suggests that model (1) does not have multi-collinearity problems.

Table 3 - Correlation matrix
This table presents the correlation matrix of variables used in this study. The definition of the variables is provided in Table 1. All variables are winsorized at the 1st and 99th percentile.

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Ln(Compensation)	1.000					
(2) CEO_Gender	0.231	1.000				
(3) Leverage	-0.074	-0.095	1.000			
(4) Size	-0.059	0.028	0.389	1.000		
(5) EBIT_Assets	0.066	0.025	-0.439	-0.028	1.000	
(6) Cash_Ratio	0.013	0.018	-0.192	-0.155	0.065	1.000

To ensure that our model does not have multi-collinearity problems, we also perform the analysis of the variance inflation factor of variables used in this study. The results are presented in Table 4 and show that the variance inflation factor of all variables is lower than 10. This confirms that model (1) does not have multi-collinearity problems.

Table 4 - Variance inflation factor
This table presents the variance inflation factor of variables used in this study. The definition of the variables is provided in Table 1. All variables are winsorized at the 1st and 99th percentile.

Variable	Variance inflation factor
CEO_Gender	1.02
Leverage	1.55
Size	1.23
EBIT_Assets	1.28
Cash_Ratio	1.05

4. Empirical Results

Table 5 shows the regression results of model (1) using a pooled OLS model. The result shows that the coefficient on CEO_Gender is positive and significant at the 1 per cent level. This suggests that male CEOs have higher compensation than female CEOs. This result supports our hypothesis 1 and is consistent with the finding of Lam et al. (2013). The advantage of using a pooled OLS model is that the estimation is easy. However, results estimated from a pooled OLS model may be biased if firms in our sample are not homogenous.

Table 5 - Multivariate results - Baseline regression

This table presents the pooled OLS regression results of the relationship between CEO gender and compensation. The sample includes 109 construction and material construction companies listed in the Vietnamese stock market from 2012 to 2019. The dependent variable is the natural logarithm of CEO compensation. The definition of variables is provided in Table 1. All variables are winsorized at the 1st and 99th percentile. The standard errors are adjusted for heteroskedasticity and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level.

	Dependent variable: Ln(Compensation)
VARIABLES	(1)
CEO_Gender	1.433***
	(0.253)
Leverage	-0.014
	(0.608)
Size	-0.060
	(0.078)
EBIT_Assets	1.018
	(1.395)
Cash_Ratio	-0.122
	(1.276)
Constant	19.311***
	(1.985)
Observations	675
R-squared	0.061

To control the heterogeneity of firms in our sample, we will employ fixed effects and random effects models to regress model (1). Using a fixed effects model can control the biased caused by time-invariant omitted variables. Using a random effects model can help increase the efficiency of the

estimation by capturing the heterogeneity between firms. The results are provided in Table 6. In columns 1 and 2, the results are estimated from fixed effects mand random effects models, respectively. The results in the two columns show that the coefficient estimated on CEO_Gender is positive and significant at the 10 per cent level in column 1 and the 5 per cent level in column 2. These results support our finding that male CEOs have higher compensation than female CEOs.

Table 6 - Robustness test - Fixed effects and random effects models

This table presents the fixed effects and random effects regression results of the relationship between CEO gender and compensation. The sample includes 109 construction and material construction companies listed in the Vietnamese stock market from 2012 to 2019. The dependent variable is the natural logarithm of CEO compensation. The definition of variables is provided in Table 1. In columns 1 and 2, the results are estimated from fixed effects and random effects model, respectively. All variables are winsorized at the 1st and 99th percentile. The standard errors are adjusted for heteroskedasticity and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level.

	Dependent variable: Ln(Compensation)	
	FE model	RE model
VARIABLES	(1)	(2)
CEO_Gender	0.641*	0.714**
	(0.362)	(0.336)
Leverage	-0.585**	-0.516*
	(0.294)	(0.271)
Size	0.216**	0.166**
	(0.106)	(0.081)
EBIT_Assets	-0.622	-0.493
	(0.623)	(0.599)
Cash_Ratio	-0.360	-0.417
	(0.519)	(0.483)
Constant	13.019***	14.227***
	(2.800)	(2.146)
Observations	675	675
R-squared	0.053	0.052

With regard to control variables, we find two control variables that impact CEO compensation significantly. The first one is firm leverage. The coefficient on Leverage is significantly negative in both two columns of Table 6, suggesting that an increase in leverage can reduce CEO compensation.

This may be because companies with high leverage will be monitored by the debtholders strictly and thus they cannot pay the CEO a high level of compensation. The second control variable that impacts CEO compensation significantly is firm size. We find a positive and significant coefficient of firm size variable. This implies that the CEO of large firms can enjoy a high level of compensation.

5. Conclusion

The aim of this study is to investigate the relationship between CEO gender and compensation. Our sample consists of 109 construction and material construction companies listed in the Vietnamese stock market from 2012 to 2019. Using a pooled OLS model, we find that female CEOs receive lower compensation than male counterparts. The result is robust when we employ fixed effects and random effects models.

Our result suggests that the CEO gender pay gap may exist in countries where the level of gender inequality is severe. Given that companies managed by female CEOs may have higher performance and lower risk than those managed by male CEOs (e.g, Faccio et al., 2016; Khan and Vieito, 2013), the lower compensation of female CEOs seems to be unreasonable. Policymakers should be aware of this situation and have some solutions to reduce the gap. Although we attempt to use a totally new setting in an emerging country where the degree of gender inequality is high, our sample is rather small. Future research on the association between CEO gender and compensation can investigate this relationship using a larger sample including companies in many industries.

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